

Application No.: 10/652800

Docket No.: TOW-039

REMARKS

Claims 1-8 were presented for examination. Claims 1-8 have been rejected under 35 U.S.C. § 103(a). Claim 1 has been amended and Claims 2 and 3 have been canceled. The following comments address all the stated grounds for rejection, and place the Claims 1-8 in condition for allowance.

Title Amendment

The title has been amended as provided in the "Amendments to the Specification" portion of this document. The amended title clearly indicates the invention to which the claims are directed. Applicant kindly requests the Examiner to withdraw the objection to the title.

Double Patenting Rejection

Claims 1, 5 and 7-8 have been provisionally rejected under the judicially created doctrine of double patenting over claims 1-5 of co-pending Application No. 10/652748. Claims 1-8 have been provisionally rejected under the judicially created doctrine of double patenting over claims 1-9, 13-15 and 18-19 of co-pending Application No. 10/608592. Claims 1, 2, 5 and 7 have been provisionally rejected under the judicially created doctrine of double patenting over claims 1-7 of co-pending Application No. 10/608581.

As no claims have been allowed in the present application, Applicant believes it is premature to address this issue at this time. If the claims of the present application are indicated to be allowable, Applicant will normally address the issue at that time, when the double patenting rejection is no longer provisional. Notwithstanding the above, Applicant submits herewith a Terminal Disclaimer to address each of the present rejections.

Claim Amendments

Claim 1 has been amended to incorporate the subject matter of Claims 2 and 3. Accordingly, Claims 2 and 3 have been canceled.

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Rejections of Claims 1-8 Under 35 U.S.C. § 103(a)

Claims 1-8 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Japanese Publication JP 11 16581 (JP '581) in view of the Japanese Publication JP 2000-311698 (JP '698). Applicant respectfully traverses these rejections.

Independent Claim 1, as amended, is directed to a fuel cell. The fuel cell includes a pair of separators, electrolyte electrode assemblies, a fuel gas supply channel, an oxygen-containing gas channel, a fuel gas supply hole, discharge passages and a fuel gas distribution passage.

The electrolyte electrode assemblies are interposed between the separators. Each electrolyte assembly includes an anode, a cathode, and an electrolyte that is interposed between the anode and the cathode. Each of the separators includes a first plate and a second plate stacked together in a stacking direction.

The fuel gas channel and the oxygen gas channel are formed between the first and second plates. The fuel gas channel enables the supply of a fuel gas to the anode, and the oxygen-containing gas channel enables the supply of an oxygen-containing gas to the cathode.

The fuel gas supply hole extends through a center of a central region of the separators. The fuel gas supply hole enables the supply of the fuel gas in the stacking direction.

The discharge passages are formed around the fuel gas supply hole and extend through the central region of the separators. The discharge passages enable the discharge of the fuel gas and the oxygen-containing gas, as an exhaust gas, in the stacking direction, after a reaction.

The fuel gas distribution passage extends between the discharge passages along a surface of the separator in a direction that is perpendicular to the stacking direction. The fuel gas distribution passage connects the fuel gas supply hole and the fuel gas channel.

Applicant respectfully submits that neither the JP '581 reference nor the JP '698 reference fail to teach or suggest *discharge passages are formed around the fuel gas supply hole*

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and extend through the central region of the separators for discharging the fuel gas and the oxygen-containing gas after reaction as an exhaust gas in the stacking direction.

The JP '581 reference teaches a solid oxide fuel cell with a groove on each of the main surfaces of a separator that extends from one end to the central portion of the separator. A fuel gas supply pipe 4 and an oxygen-containing gas supply pipe 5 are inserted into the respective grooves 3 with their tip end crushed to form a flat shape. The fuel gas flows towards the periphery of the separator 1 and is then discharged from an outlet pipe. Likewise, the oxygen-containing gas flows towards the periphery of the separator and then is discharged from an outlet pipe. The fuel gas and oxygen-containing gas supply pipes are connected to a fuel gas distributor 10 and a oxygen-containing gas distributor 11, respectively. The fuel gas and oxygen-containing gas distributors are disposed outside a heat-shielding wall 8 that surrounds the stacked body 7.

The JP '581 reference, however, fails to teach or suggest *discharge passages are formed around the fuel gas supply hole and extend through the central region of the separators*. Rather, the JP '581 reference teaches exhaust gas flows toward the periphery of the separator. As such, the JP '581 references does not teach or suggest *discharging the fuel gas and the oxygen-containing gas after reaction as an exhaust gas in the stacking direction*, but rather, teaches discharging the exhaust towards the periphery of the separator. By having the discharge passages of the claimed invention extend through the central region of the separators in the stacking direction, the heat of the exhaust gas is easily transmitted throughout each separator, thereby, allowing for uniform heat distribution in each of the separators.

The JP '698 reference relates to a power system. Electrolyte plates 20 and interconnector plates 30 are alternately stacked and aligned along their respective apertures. The apertures form axial manifolds that include an input oxidizer manifold, an input fuel manifold and a spent fuel manifold. The input oxidizer 17, formed by apertures 22, 32 and 22', and fuel manifold 18, formed by apertures 24, 34 and 24', feed the cell unit with the input reactants, and the spent fuel manifold provides an exhaust for the spent fuel. The spent fuel manifold 19 is formed by apertures 26, 36 and 26'. The input oxidizer and fuel manifolds are at the central portions of the

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electrolyte and interconnector plates. The spent fuel manifold, however, is at the outer portion of the electrolyte and interconnector plates.

The JP '698 fails to teach or suggest *discharge passages are formed around the fuel gas supply hole and extend through the central region of the separators*. Rather, the JP '698 reference teaches a discharge manifold at the periphery of the separators. As noted above, by having the discharge passages extend through the central region of the separators in the stacking direction, the heat of the exhaust gas is easily transmitted throughout each separator, thereby, allowing for uniform heat distribution in each of the separators

Further, neither JP '581 reference nor the JP '698 reference teach or suggest *a fuel gas distribution passage extends between the discharge passages along a surface of the separator, perpendicularly to the stacking direction for connecting the fuel gas supply hole and the fuel gas channel*. This configuration allows pre-heating of the fuel gas that flows through the fuel gas supply hole and distribution passages with the hot exhaust gas that flows through the discharge passages before being supplied to the anode of the electrolyte electrode. In this manner, the heat dissipated by the exhaust gas is effectively used before the exhaust is discharged from the fuel cell stack.

In addition, the configuration of the claimed invention prevents local heating associated with leaks from the fuel gas supply hole or the fuel gas distribution passage because such a leak would flow into the discharge passages. Accordingly, the electrolyte electrode assemblies are protected from thermal damaging due to a fuel gas leak.

For at least these reasons, Applicant contends that the cited references do not teach or suggest all the patentable features of claim 1. Claims 4-8 depend on claim 1, and therefore incorporate all the patentable features of claim 1. Applicant respectfully requests the Examiner reconsider and withdraw the rejections of claims 1 and 4-8 under 35 U.S.C. § 103.

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Conclusion

In view of the above amendment, applicant believes the pending application is in condition for allowance.

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Respectfully submitted,

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